

Future Producer of
Neodymium & Praseodymium
to the Permanent Magnet Industry



Investor Presentation
May 2018



#### All currency amounts are in A\$ unless stated otherwise.

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#### **Exploration Targets**

The terms "Target" or "Exploration Target" where used in this presentation should not be misunderstood or misconstrued as an estimate of a Mineral Resource as defined in this context. Exploration Targets are conceptual in nature, there has been insufficient exploration to define a Mineral Resource and it is uncertain further exploration will result in the determination of a Mineral Resource.

#### **Competent Persons' Statement**

The information in this presentation that relates to Resources is based on information compiled by Lynn Widenbar. Mr Widenbar is a consultant to the Company and a member of the Australasian Institute of Mining and Metallurgy. The information in this presentation that relates to Exploration Results is based on information compiled by Andy Border, an employee of the Company and a member of the Australasian Institute of Mining and Metallurgy.

Each has sufficient experience relevant to the styles of mineralisation and types of deposits which are covered in this announcement and DFS and to the activity which they are undertaking to qualify as a Competent Person as defined in the 2012 edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code"). Each consent to the inclusion in this announcement and DFS of the matters based on his information in the form and context in which it appears.

The information in this presentation that relates to the Fraser's and Bald Hill Ore Reserve is based on information reviewed or work undertaken by Mr Frank Blanchfield, FAusIMM, and an employee of Snowden Mining Industry Consultants. Mr Blanchfield has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the preparation of mining studies to qualify as a Competent Person as defined by the JORC Code 2012. Mr Blanchfield consents to the inclusion in this announcement and DFS of the matters based on his information in the form and context in which it appears.

The scientific and technical information in this presentation that relates to process metallurgy is based on information reviewed by Mr Dale Harrison MAusIMM, who is a metallurgical consultant and employee of Wave International. Mr Harrison has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined by the JORC Code 2012. Mr Harrison consents to the inclusion in this announcement and DFS of the matters based on his information in the form and context in which it appears.

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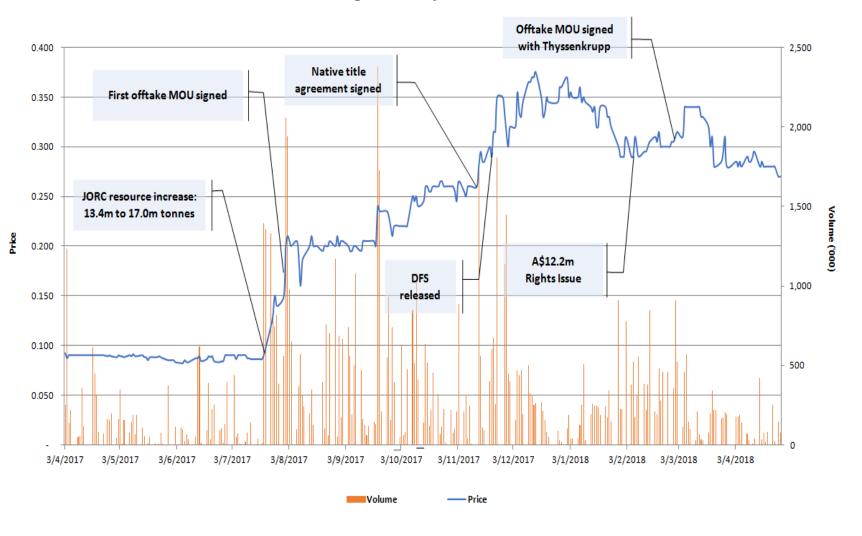
## **Hastings Equity Statistics**



#### Steady growth in market cap since Jan 2014

- Market Cap ~ A\$ 220m
- ~ 1200 Shareholders
   +55% in 2017
- Top 10 shareholders owns
   ~ 70%
- A\$59m raised since 2014
- Cash: A\$25m post rights issue
- No Debt
- Included in the ASX All Ordinaries Index

#### **Hastings ASX Daily Price Chart**



## **Definitive Feasibility Study (DFS) – Yangibana**



#### **Independent Study by Wave International and Snowden**

- JORC Resource of 21m tonnes supports an initial 8 years mine life on 100% held ground
- Maiden JORC Probable Ore Reserves of 5.15 million tonnes on 100% owned ground
- Highest known Neodymium & Praseodymium (Nd-Pr) content at 41% of TREO
- Mining 1m tonnes pa to produce up to 15,000 tpa of Mixed Rare Earths Carbonate
- Nd-Pr metallurgical recovery 75.6% achieved in pilot test plant
- Financial Highlights:
  - NPV (after tax) = A\$466m at 8% discount rate
  - IRR = 78%
  - EBITDA payback of 2.3 years from average equity drawdown period
  - Pre-production CAPEX A\$335m; OPEX A\$17.06/kg TREO (US\$12.8/kg)
- Additional Production Target will increase Reserves to 8m tonnes on 100% owned ground

<sup>\*</sup> The underlying assumptions and production targets have not changed from the date of release of the DFS on 28 November 2017

## Four off-take MOUs signed





#### 70% of Yangibana production under offtake MOUs to German and Chinese customers

- ➤ Thyssenkrupp Raw Materials Gmbh 5,000 tonnes per annum of Yangibana MREC for 10 years; for the German and European automotive and other industries (28 Feb 2018)
- ➤ Baotou Sky Rock Rare Earth New Material Co. Ltd 2,500 tonnes per annum (1 Aug 2017) Sky Rock produces high tolerance NdFeB permanent magnets. Main products include
  - Sintered Neodymium Magnets
  - Sintered Samarium Cobalt Magnets
- ➤ China Rare Earth Holdings Ltd 2,000 tonnes per annum (1 Sept 2017)
  - CREH started business in 1987 and listed on HKEX in 1999
  - Established manufacturer of rare earth derived and refractory products
- ➢ Qiandong Rare Earth Group (GQD) 1,500 tonnes per annum (13 Sept 2017)
  - GQD founded in 1988
  - Through 11 subsidiary companies involved in all parts of the rare earth product supply chain
- ✓ Chinese offtake Selling price will be set at average of 3 months market prices prior to shipment
- ✓ Potential for additional off-take with Japanese customers

## Some End Uses for Magnets' Rare Earth

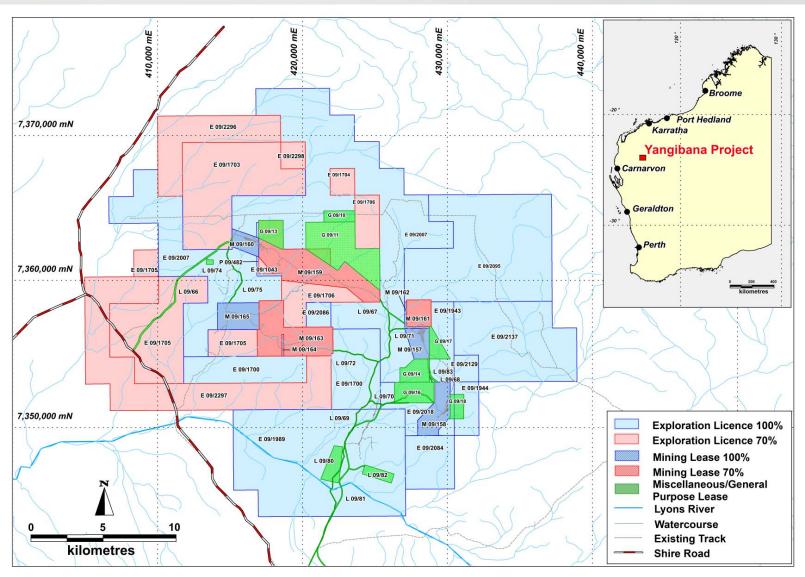




## **Yangibana – Western Australia**

## HASTINGS Technology Metals Limited

# AAA Sovereign Rating, Established Mining Region Outcrops and level terrain, easy to mine



- Total Yangibana area ~ 650 km²
- 21 years Mining Leases
   Granted since March 2016
   ~ 50 km²
- Native Title Agreement signed November 2017 covering all tenements
- Various Miscellaneous and General Purpose Leases granted supporting infrastructure
- Application lodged for permits to commence mine construction

### **JORC Resources**



### **High Neodymium and Praseodymium content**

- Total Measured, Indicated and Inferred Resources now at 21m tonnes\*
- Total Probable Ore Reserve at 5.15m tonnes and Additional Production Target of ~ 2.5m tonnes to be added on by late 2018
- In-ground ratio of Nd-Pr as % of TREO ranges from 34% (0.40%/1.18%) to as high as 57% locally at Simon's Find deposit
- Most resources contained on Hastings 100% owned ground and smaller portion on 70% JV ground

#### **Total Yangibana JORC Resources (rounded)**

	Category	Tonnes	Nd <sub>2</sub> O <sub>3</sub> +Pr <sub>6</sub> O <sub>11</sub>	TREO	$Nd_2O_3$	Pr <sub>6</sub> O <sub>11</sub>
			%	%	ppm	ppm
	Measured	3,900,000	0.42	1.19	3,372	851
	Indicated	8,600,000	0.42	1.25	3,368	858
1	Inferred	8,400,000	0.36	1.09	2,829	740
	TOTAL	21,000,000	0.40	1.17	3,152	809

#### Hastings 100% owned ground

Category	Tonnes	$Nd_2O_3+Pr_6O_{11}$	TREO	$Nd_2O_3$	Pr <sub>6</sub> O <sub>11</sub>
		%	%	ppm	ppm
Measured	3,000,000	0.42	1.06	3,404	809
Indicated	6,600,000	0.41	1.09	3,324	794
Inferred	5,800,000	0.35	0.93	2.840	684
TOTAL	15,400,000	0.39	1.03	3,158	756

### Hastings 70% owned JV ground NCTION

Category	Tonnes	Nd <sub>2</sub> O <sub>3</sub> +Pr <sub>6</sub> O <sub>11</sub>	$Nd_2O_3$	Pr <sub>6</sub> O <sub>11</sub>					
		%	%	ppm	ppm				
Measured	900,000	900,000 0.43 1.64 3,25							
Indicated	2,100,000	0.46	1.76	3,507	1,061				
Inferred	2,700,000	0.37	1.42	2,806	860				
TOTAL	5,600,000	0.41	1.58	3,134	955				

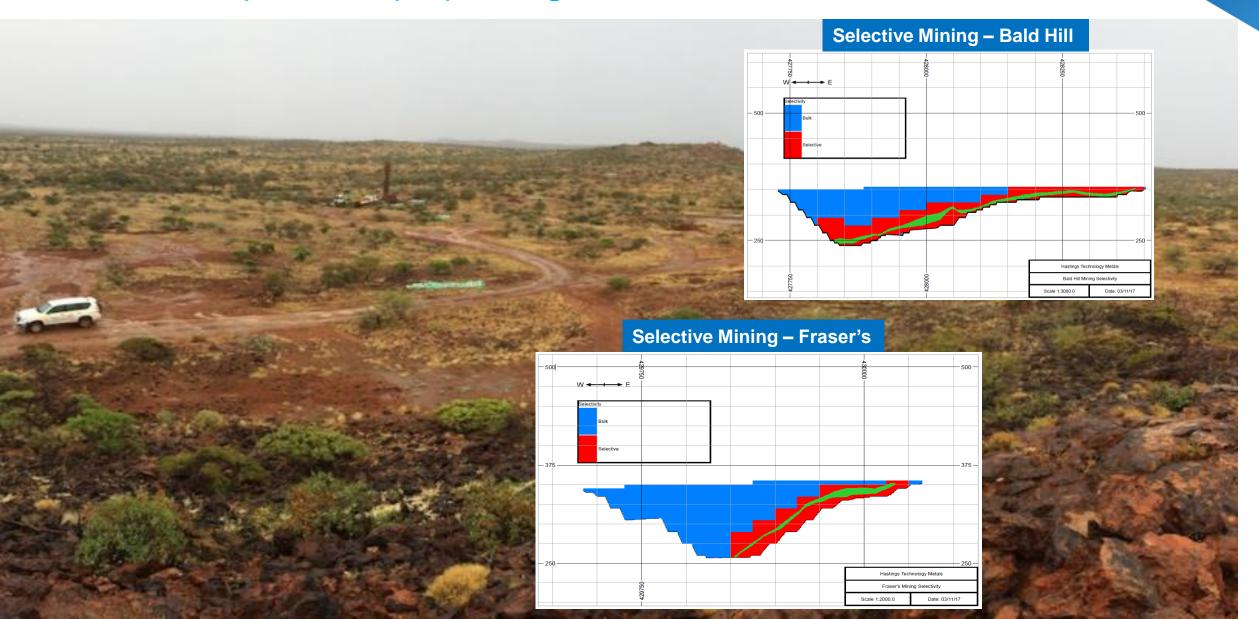
8

<sup>\*</sup> Hastings ASX release 22 Nov 2017;

## **Favourable Terrain**



### Mineralised out crops, shallow open pit mining



## **Native Title Agreement signed**





### Agreement reached with Thiin-Mah Warriyangka, Tharrkari and Jiwarli

- Signed 9th November 2017
- < 1% royalty based on sales for the LoM
- Applicable to all rare earth and niobium mined
- Provision of jobs and training for the community





## **Yangibana Advantage – Highest Nd-Pr ratio**



Con	npa	rison of F	REO Di	istribu	tion 8	k Bas	ket \	/alue
Betv	veel	n Hasting	s and	Major	Light	REF	Prod	ucers

Between Hastings and Major Light RE Producers										
RE Oxide/TREO	Unit	Hastings	Cł	nina	Outside of China					
NE OXIGE/TREO	Omit	riastiligs	Baotou	Sichuan	Mt Weld	Mountain Pass				
Lanthanum	%	9.99	25.94	36.50	25.16	33.22				
Cerium	%	39.59	50.69	47.90	46.36	49.10				
Praseodymium	%	8.01	5.15	4.10	5.38	4.30				
Neodymium	%	33.80	15.90	10.00	18.79	12.00				
Samarium	%	3.88	1.21	0.70	2.27	0.80				
Europium	%	0.84	0.22	0.08	0.47	0.12				
Gadolinium	%	1.80	0.39	0.23	0.85	0.17				
Terbium	%	0.15	0.05	0.04	0.06	0.04				
Dysprosium	%	0.50	0.11	0.06	0.16	0.07				
Yttrium	%	1.14	0.25	0.31	0.45	0.10				
Other	%	0.29	0.10	0.08	0.05	0.09				
Economic Value Factor		1.90	1.00	0.72	1.14	0.81				

- Nd-Pr /TREO composition is validated by customers in the MREC
- Economic Value Factor calculated on individual % of REE in the ore body x REO prices
- Yangibana: high Nd-Pr content of 41%
- Yangibana basket price @ USD30.50/kg (Oct 2017) used in DFS
- 9th Mar 2018 basket price is \$29.20

**Basket Price USD/kg** 

29.20

15.35

11.15

17.45

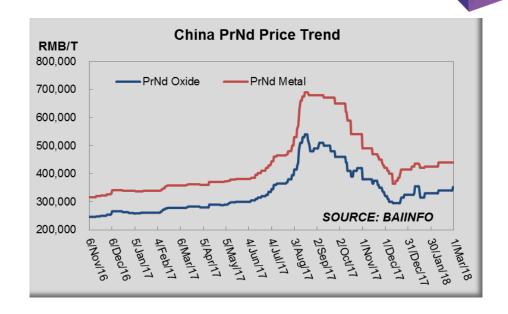
12.40

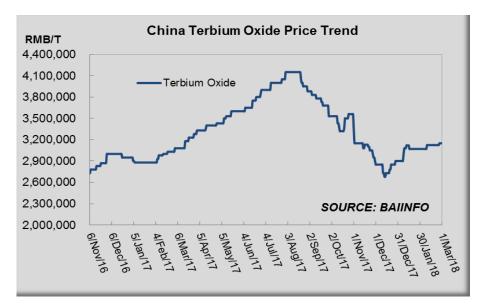
## Spot Prices of Rare Earth Oxides (Mar 2018)



China F.o.B. Export prices	s 09-Mar-2018	3 (USD/kg) & Y	TD change
Lanthanum oxide	La2O3	\$ 2.37	1 %
Cerium oxide	CeO2	\$ 2.30	0 %
Praseodymium oxide	Pr6O11	\$ 70.50	+11 %
Neodymium oxide	Nd2O3	\$ 58	+22 %
Dysprosium oxide	Dy2O3	\$ 190.50	+9 %
Terbium oxide	Tb407	\$ 517.50	+22 %
Samarium oxide	Sm2O3	\$ 2.25	-2 %
Europium oxide	Eu2O3	\$ 59.50	- 9 %
Erbium oxide	Er2O3	\$ 26	+2 %
Holmium oxide	Ho2O3	\$ 64.35	+3 %
Lutetium oxide	Lu2O3	\$ 671.10	+3 %
Yttrium oxide	Y2O3	\$ 3.35	0 %

Source: ASIAN METAL 09 Mar 2018





## **The Yangibana Process and Product**



### From Mining to Mixed Rare Earth Carbonate (MREC)

Successful Beneficiation and Hydrometallurgy pilot plan test-work proves simple and effective production process flow sheet.

1m t.p.a. mined

30 - 40k t.p.a. Beneficiated Concentrate

~15,000 t.p.a. MREC = ~8,500 t.p.a. REO

#### MINING

- Open pit contract mining @ rate of 1m t.p.a.
- Total JORC Resource ~
   21m tonnes
- In-ground Total Rare Earth
   Oxides (TREO) Grade ~
   1.17%



\* ASX release: 22-Nov-2017

#### BENEFICIATION

- Upgrade TREO more than 20x from ore to Beneficiated concentrate
- Pilot Plant achieved 23% TREO concentrate
- Post-pilot optimisation -27% TREO at 85%



\* ASX release: 20-Mar-2017

#### **HYDROMETALLURGY**

- Acid bake, water leach, impurity removal & RE carbonate precipitation
- TREO recovery rates in final MREC =/> lab results
- Produced Samples for offtake customers testing



\* ASX release: 22-May-2017

#### MREC

- Up to 43% Nd-Pr portion of TREO in MREC
- Removed impurities to acceptable product specifications
- Sale of MREC



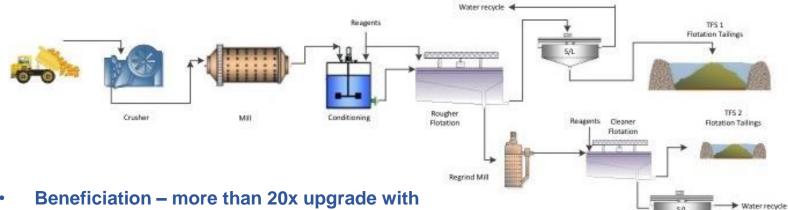
\* ASX release: 22-May-2017

<sup>\*</sup> See Company ASX releases for additional information on all processes.

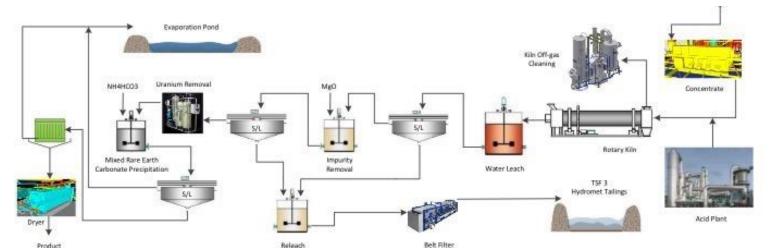
## **Yangibana Flowsheet**



#### Pilot test work at ALS and ANSTO confirms production process



- Beneficiation more than 20x upgrade with 85% Nd-Pr recovery at optimum conditions
- Hydrometallurgy 41% Nd-Pr content in the Yangibana MREC





Flotation Pilot Plant Operation at ALS, Perth



Final flotation concentrate from beneficiation pilot



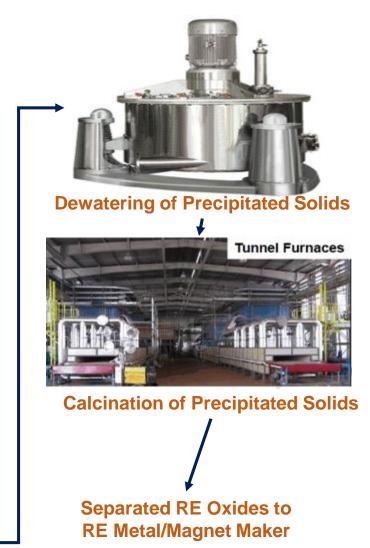
Neutralisation & Precipitation Circuit – Hydromet - ANSTO

## **Downstream Toll Treatment**

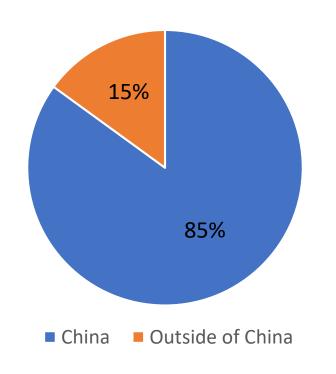


### Estimated Tolling cost USD 2.50/kg (based on 15,000 tons MREC)





#### **Global Separation Capacity**

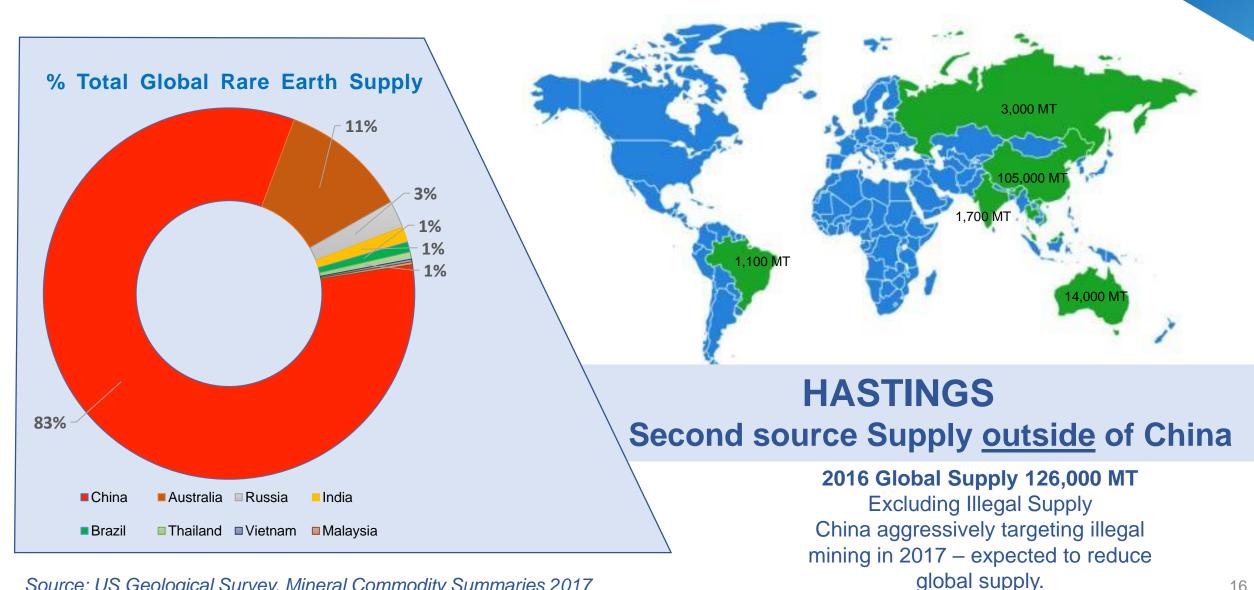


Excess Separation capacity outside of China includes the separators in Malaysia, India, Vietnam, Kazakhstan/eastern EU, etc.

## **Global Rare Earth Supply 2016**



### **Supply diversification increasingly strategic**

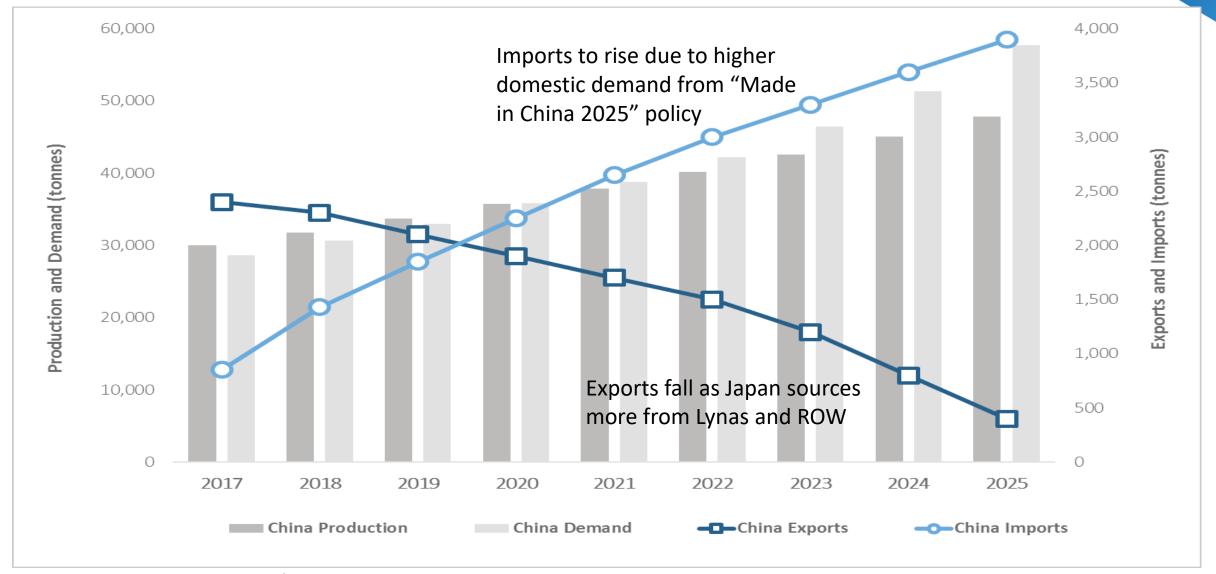


Source: US Geological Survey, Mineral Commodity Summaries 2017

## **Global Nd-Pr Oxide Supply Demand 2017 - 2025**



### Possible shortage - crossover point in 2020



## Global Demand Growth for Permanent Magnets



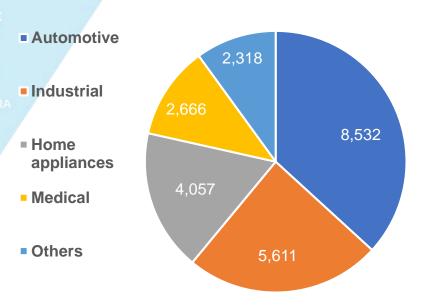
### NdFeB cheapest by strength per unit/sqcm

Materials	Average Price (\$/lb.)	Average Max. Energy Product (MGOe)	\$/MGOe
Hard Ferrite	2.0	3.5	N/A
NdFeB	75.0	30.0	2.3
Samarium-Cobalt	162.0	22.0	7.4
AlNiCo	27.0	8.0	3.4

Considering weight, material costs and overall strength, the NdFeB magnet offers the **best value for money** 

Application	2016 USDm	2017 USDm	2022 USDm	CAGR% 2017–2022
Consumer electronics	1,933.9	2,090.8	3,078.0	8.0
Electric motors	1,888.9	2,074.6	3,287.3	9.6
Sonic equipment, magnetic sensors, actuators and transducers	1,131.8	1,228.5	1,846.8	8.5
Medical devices	951.9	1,025.1	1,514.4	8.1
Generators	914.5	984.4	1,514.4	9.0
Others	674.7	732.2	1,071.0	7.9
TOTAL	7,495.7	8,135.6	12,311.9	8.6

## Global Market for Permanent Magnets - by Industry 2022 (USD m)



Source: BCC Research: Magnets and Magnet Materials: Global Markets Oct 2017.

### **Blockchain-enabled Supply Chain Platform**





## Ethical Mining



**E**nvironmentally **V**iable



**E**conomically **E**fficient

A De-Centralised supply chain management tracking system

#### 1. To assure

- Source of Origin Business Footprint
- Compliance to International Standards and Regulations
- Socially Responsible from Mine to Production (Market)

#### 2. To deliver

- 100% Transparency
- Good Governance
- Efficacious & Efficient Cost
- Market Confidence & Trust

Providing the global community a product value that is both an **Economic** and **Ethical** investment!

#### **How does it work? - TRACK & TRACE HASTINGS MREC**



#### **Source Of Origin**

\*AAA



#### **Blockchain Platform**



Tracks each step of goods and services between businesses and across borders

Decentralised Digital Ledger







#### Step 1



- Each package tagged (tamper proof) RFID or QR Code.
- Data composite : weight, date, time, source
- Ledger of Transactions
- RFID is coded with the Sales Contract ID #C01

#### Step 2



**Smart Contract** 

- Computer code on the BC
- Code facilitates, verifies enforce performance of contract
- Automate exchange of value transparently, conflict-free
- Reliable Pricing & History
- Removes middleman service

#### **Metal Trader**





Blockchain









The mobile App will read the Contract ID and display package info including the source of origin





Updates location of package using mobile application and syncs the data with the Supply Blockchain Platform.

## **Early Works Programme**

#### Commenced Q2 2018





Bulk earthworks contracts scope developed and work to start in April



240 room
Accomodation
village construction
starts in May



Civil engineering
design being
finalised for:
•Access roads
•Village areas
•Laydown pad for
core and Sample
prep yard



Establised an
Owners Team
for Early
Contractor
Involvement
(ECI) for project
construction to
completion

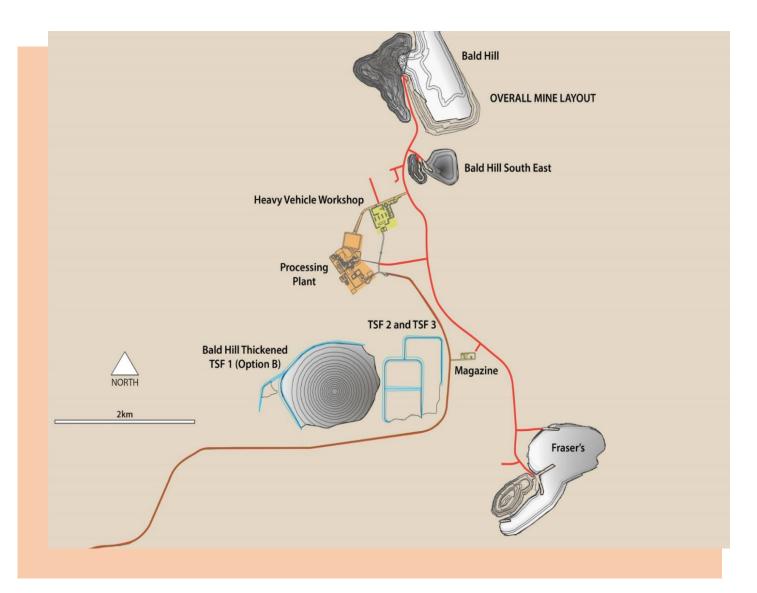


Order Critical Path
Long lead time items
ie. Rotary Kiln,
Sulphuric Acid Plant,
SAG mill

## **Overall Mine Layout**



### **Optimising logistics between deposits**



- Mining by conventional drill and blast
- Pit optimisations were completed to determine the economic mining limits for each deposit
- Waste dumps located to minimise haulage distances
- Mining schedule based on value creation and waste reduction
- Water supply sourced from borefield near to process plant

## **Capital Cost for Infrastructure A\$50-60m**



### **Expected Completion 4Q 2018**





- Roads /Bulk Earthworks Access Roads & and River Crossings
- Accommodation Village and support infrastructure
- Airstrip on site to be constructed 2Q 2019
- Power Plant Diesel, LNG and Solar being evaluated
- Alternative Trucking & Shipping Logistics Geraldton vs Fremantle
- Exploring partial funding support for infrastructure with NAIF

### **Timetable to Production**





### Milestones to production by Q1 2020

#### PROJECT IMPLEMENTATION SCHEDULE FOR YANGIBANA RARE EARTHS PROJECT

	20	17						201	18						2019								2020						
Activities	N	D	J	F	M	Α	М	J	J	Α	S	0	N	)	J	F	М	Α	M	J	J	Α	S	O N	D	J	F	M	Α
Definitive Feasibility Study (DFS)																													
Permitting & Approvals																													
Design for Access Road & Bulk Earthwork for Accom Camp																													
Construct Access Road & Accomodation Camp																													
Basic Engineering Design (BED)																													
Detailed Engineering																													
Procure Long Lead Equipment - Rotary Kiln										+																			
Procure Long Lead Equipment - Sulphuric Acid Plant																													
Procurement (other equipment & bulk material)																													
Production Plant Construction																													
Commissioning																													
Commercial Production Start																													

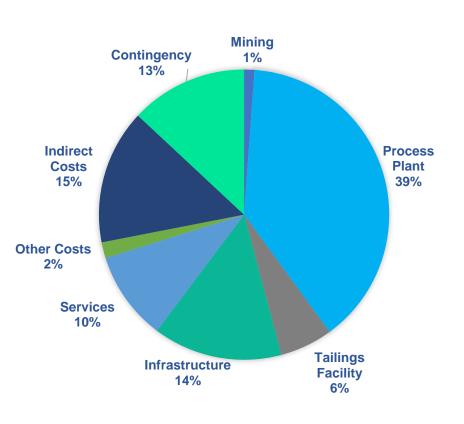
Above shows only the main Tender Packages



## **DFS Capital Cost A\$335m**



### An improvement of 20% from PFS



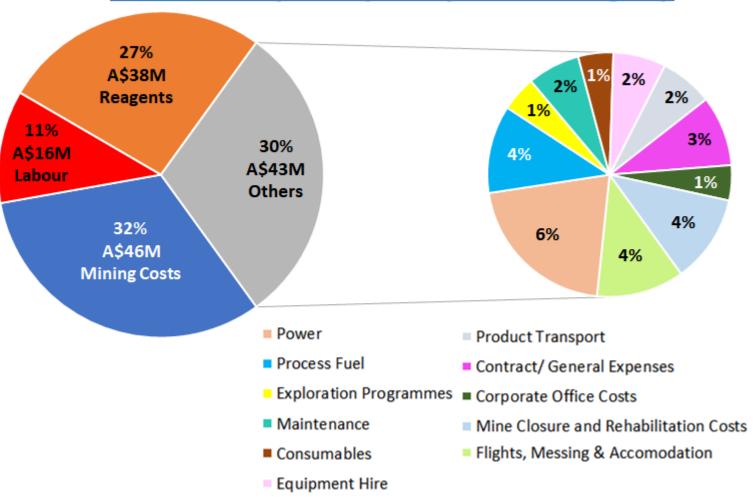
Cost Centre	A\$ Million	Cost Centre	A\$ Million
Process Plant	\$130.2	Non Process Infrastructure	\$105.1
Crushing and Screening	3.6	Mine Infrastructure	3.9
Grinding	14.1	TSF 1,2 and 3	19.5
Flotation	27.0	Evaporation Pond	0.3
Beneficiation	4.1	Accommodation Village	14.6
Hydrometallurgy	50.9	Roads	22.3
Hydrometallurgy Reagents	8.1	Air strip	1.6
Reagents Plants	19.7	Plant / Mining Buildings	9.8
Pipe Racks	2.7	Water Supply	9.2
		Power Supply	17.0
		ICT	0.9
Cost Centre	A\$ Million	Other Services	6.2
Indirect Costs	\$56.3		
Spares & First Fills	5.9	Contingency	43.7
EPCM Costs	37.6		
Owners Costs / Pre Production	7.9		
Vendor Support / Commissioning	3.6		
Project Insurances	1.2	Total Pre-Production CAPEX	\$335.3

## DFS¹ Operating Cost A\$17.06/kg (US\$13.00/kg) of TREO



### An improvement of 30% from PFS

## A\$142m / year split by cost category



- March 2018 MREC Basket Price USD 29/kg
- Opex Costs estimates between USD13/kg and conservatively USD15/kg depending on life of mine
- Estimate for separation costs ~ USD3/kg, rounded up
- Financing costs<sup>2</sup> up to ~ USD3/kg
- Conservative est of Pre-tax profit of USD8/kg = 27% profit margin

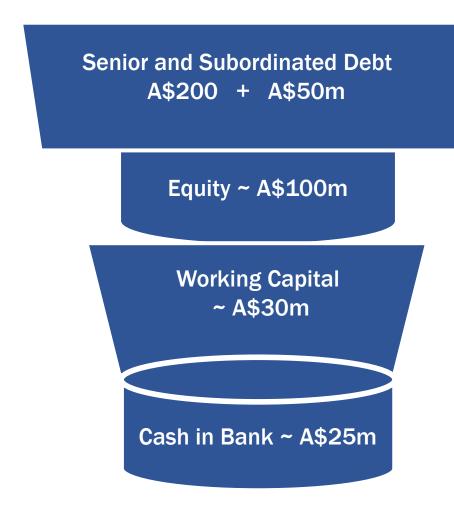
<sup>&</sup>lt;sup>1</sup>There have been no changes in underlying assumptions or production targets since the DFS was released on 28 November 2017.

<sup>2</sup>Funding discussions in progress, final costs dependent on structure of financing – a conservative estimate is US\$3/kg (DFS US\$1/kg)

## **Funding Programme**



Commenced Q1 2018



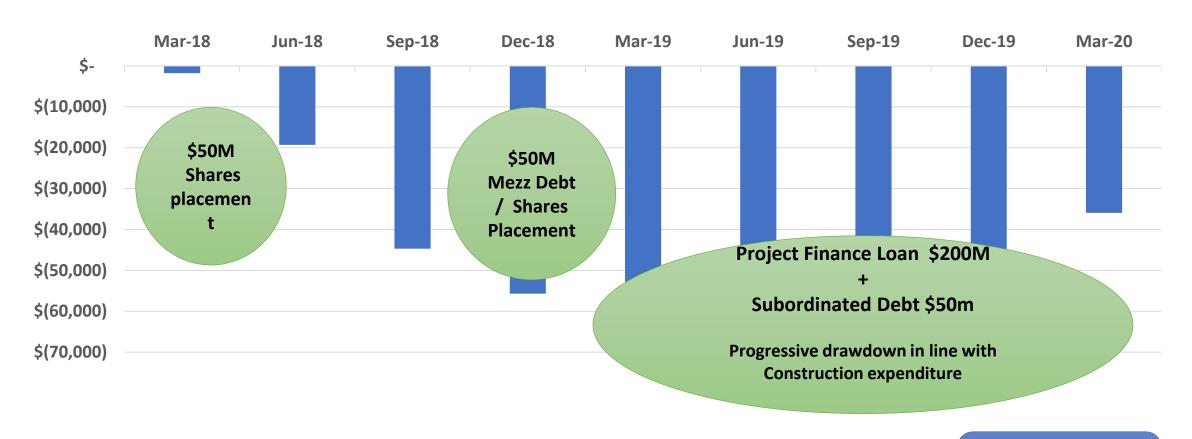
- Project Finance funding 65% Debt : 35% Equity
- Senior & Subordinated Debt financing potential sources:
  - ✓ Export Credit Agencies ie. Euler Hermes, JBIC
  - ✓ Australian Government funded loan agencies ie. NAIF, CEFC
  - ✓ Short term Bridging Loan
  - ✓ Off take customer finance
- Working capital financing and trade lines
- Equity Private Placement, Rights Issue
- Cash post rights issue A\$25m (zero debt)

## **Projected Funding Schedule and Drawdown**



#### Cash as @ 31 March 2018 - A\$25m

#### HAS Projected Quarterly Drawdown and Proposed Cash Raising (A\$'000)



 Current
 Mar 18
 Jul 18
 Oct 18
 Jan 19
 Aug 19

 \$25M
 \$50M
 \$50M
 \$150M
 \$50M

Total Cash \$375M

### **Board of Directors**



### **Experienced Directors and Management Team**



**Guy Robertson**Finance Director &
Company Secretary

- 30+ years CFO experience
- CFO for various ASX listed junior mining companies
- Senior finance executive in Jardine Matheson Group in Hong Kong and Australia including Jardine Lloyd Thompson, Colliers Jardine, and Franklins Limited



Charles Lew
Executive Chairman

- Corporate Finance Director HG Asia Securities 1990 - 1997
- MD of ABN Amro Investment Bank Singapore 1997 - 2000
- Independent Director of RHB Banking Group 2004 - 2016
- 30+ years experience in investment banking in London (HSBC & Robert Fleming) and in Singapore
- Private investor and entrepreneur in F&B, real estate, financial services, etc



Jean Claude Steinmetz

Non-Exec. Director / Commercial

Director

- Previously Chief Operating Officer for Lynas Corporation
- 25+ years Involved in the chemical industry with Rhodia and General Electric
- Chairman of the Auto Plastic and Innovative Materials Committee of Sino-EU Chemical Manufacturers Association

### **Management Team**

## HASTINGS Technology Metals Limited

### In depth experience and specialised skills



Andy Border

General Manager Exploration

- 40+ years experience as a geologist
- Rare earths, copper, gold and industrial minerals
- Recent roles include
   Exploration Manager, COO and MD of a number of ASX-listed companies with projects in Australia and elsewhere



**Stefan Wolmarans Chief Operating Officer** 

- 20 years experience in planning & management of mining projects including non-process mine infrastructure, municipal, commercial and industrial projects in Australia and Africa.
- Study Leader responsible for delivering the Yangibana Project DFS
- Chartered professional engineer (CPEng:Civil) Australia; Registered Professional Engineer (RPEQ) in Queensland



Hannes Zandberg
Project Director

- 30 years experience in mining, metallurgy, chemical refinery, infrastructure, power generation and advanced control systems; 10 years in operations and 20 years in projects
- Area Manager SNC-Lavalin Project Services, Project Director - Dundee Precious Metals, Engineering Manager – Moly Mines



Robin Zhang
Process Engineering Manager

- 20+ years experience in R&D, project engineering, plant commissioning & operations
- 8 years at Lynas Corporation -Senior Technical Services & Project Development Manager
- 11 years with Gansu Rare Earth Group, China - Deputy Director of Technical Centre

## **Summary**





- Experienced management team with rare earth production experience
- Definitive Feasibility Study (DFS) completed Nov 2017
- Off-take MOUs signed with Thyssenkrupp, Germany and 3 Chinese RE producers
- Native Title Agreement signed
- Mining Lease granted for 21 yrs since March 2016



- MREC with 41% NdPr content
- Basket price (March 2018): USD29.20/kg
- Mine construction 2Q 2018
   Production Q2 2020
- Probable Ore Reserves 5.15m tonnes + ~ 2.5m tonnes 3Q'18
- JORC Resource Estimate currently @ 21.0m tonnes



- Market Cap A\$240m
- NPV A\$466m
- IRR 78%
- EBITDA payback 2.3yrs
- Cash post rights issue A\$25m
- No debt
- Pre-tax profits margin (est) USD8/kg

